UNITED STATES PATENT AND TRADEMARK OFFICE

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EXAMINER
LEE, TOMMY D

ART UNIT	PAPER NUMBER
2624	

DATE MAILED: 08/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-95_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) _64,80,85,90 and 95_ is/are allowed.

6)☐ Claim(s) _1-8,12-24,28-42,47-54,56-60,65-79,81-84,86-89 and 91-94_ is/are rejected.

7)☒ Claim(s) _9-11,25-27,43-46,55 and 61-63_ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All b)☐ Some * c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _2_.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Priority

1.   Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which

papers have been placed of record in the file.

Specification

2.   The lengthy specification has not been checked to the extent necessary to

determine the presence of all possible minor errors. Applicant's cooperation is

requested in correcting any errors of which applicant may become aware in the

specification.

Claim Rejections - 35 USC § 112

3.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly
> claiming the subject matter which the applicant regards as his invention.

4.   Claims 12-14, 17-19, 28-30, 35-37, 47-49 and 65-74 are rejected under 35

U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and

distinctly claim the subject matter which applicant regards as the invention.

Each of claims 12-14, 17-19, 35-37 and 65-74 recite repression of the

occurrence of dots or quantized levels in either *medium* or *dark* regions of an image.

"Medium" and "dark" are relative terms which do not enable one of ordinary skill in the

art to ascertain the degree of darkness required by the claims, and thus the scope of

applicant's invention cannot be determined. Claims 28-30 and 47-49 are also indefinite,

by way of their dependence from indefinite claims 17-19 and 35-37, respectively.

Claim Rejections - 35 USC § 102

5.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6.   Claims 15, 16, 18, 20-24, 29, 33, 34, 36, 38-42, 48, 50-54, 56-60, 75 and 91-94

are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent 6,160,921

(Marcu).

Regarding claims 15, 16, 18, 20-24 and 29, Marcu discloses an image

processing method, comprising the steps of multi-level quantizing multi-tone image data

(image data values can be quantized to multiple levels (column 3, lines 6-8; column 9,

lines 66-67)); and repressing occurrence of one or more specific quantized levels for a

specific level region of the image data relating to the one or more specific quantized

levels (in highlight (range 230-255) and shadow (range 25-40) regions, isolated dots

may be removed (column 4, lines 46-56)). Re-quantization is performed for the one or

more specific quantized levels, occurrence of which is to be repressed (removal of

isolated dots amounts to re-quantization to either the lowest or highest values,

depending on whether the region is highlight or shadow). Occurrence of the one or

more specific quantized levels is repressed for a high level region of the image data

(isolated dots removed from highlight region (column 4, lines 46-56)). An occurrence

rate of the one or more specific quantized levels, occurrence of which is to be repressed, is controlled based on the number of pixels quantized to quantized levels higher than 0, or to a specific quantized level, in a specific region in the periphery of a target pixel and the level of the image data of the target pixel (In shadow region, if no white dot located alone a road map, a white dot is placed at the current pixel; if white dot is detected, then the current pixel is set to a black value (column 9, lines 4-27). In highlight region, converse process is carried out (column 9, lines 28-35)). A degree of repressing occurrence of the one or more specific quantized levels is changed according to a feature of the image (repression confined to shadow and highlight regions (column 8, lines 42-58)).

Regarding claims 33, 34, 36, 38-42, 48 and 50-54, Marcu discloses an image processing apparatus, comprising a first part multi-level quantizing multi-level input image data (image data values can be quantized to multiple levels (column 3, lines 6-8; column 9, lines 66-67)); and a second part repressing occurrence of one or more specific quantized levels for a specific level region of the image data relating to the one or more specific quantized levels (in highlight (range 230-255) and shadow (range 25-40) regions, isolated dots may be removed (column 4, lines 46-56)). Said second part performs re-quantization for the one or more specific quantized levels, occurrence of which is to be repressed (removal of isolated dots amounts to re-quantization to either the lowest or highest values, depending on whether the region is highlight or shadow). Said second part represses occurrence of the one or more specific quantized levels for a high level region of the image data (isolated dots removed from highlight region

(column 4, lines 46-56)). Said second part controls occurrence rates of the one or more specific quantized levels, occurrence of which is to be repressed, based on the number of pixels quantized to quantized levels higher than 0, or to a specific quantized level, in a specific region in the periphery of a target pixel and the level of the image data of the target pixel (In shadow region, if no white dot located alone a road map, a white dot is placed at the current pixel; if white dot is detected, then the current pixel is set to a black value (column 9, lines 4-27). In highlight region, converse process is carried out (column 9, lines 28-35)). Said second part changes degrees of repressing occurrence of the one or more specific quantized levels according to a feature of the image (repression confined to shadow and highlight regions (column 8, lines 42-58)).

Regarding claims 56 and 57, Marcu discloses an image processing apparatus, comprising: a first part adding an error to input image data (column 8, lines 30-32); a second part multi-level quantizing the image data to which the error is already added by said first part, using a plurality of quantization thresholds (column 8, lines 36-42; column 2, line 66-column 3, line 8; column 9, lines 59-67); a third part re-quantizing the quantized data provided by said second part, to another quantized level, for one or more specific quantized levels other than the highest quantized level and quantized level 0, as the need arises, and outputting the thus-obtained data as an output image data (column 8, lines 42-56; column 9, lines 4-35); a fourth part obtaining the error to be added to the input image data, from the output image data and image data to which the error is already added by said first part, and providing the thus-obtained error to said first part (column 8, lines 57-61); and a fifth part detecting, from the output image data,

the number of pixels quantized to be higher than the quantized level 0 in a specific

region in the periphery of a target pixel, and providing the thus-obtained number to said

third part (column 9, lines 14-32), wherein said third part comprises a threshold, relating

to each of said one or more specific quantized levels, determined based on the number

provided by said fifth part, with the level of the image data to which the error is already

added, and, thereby, determines whether re-quantization for said each of said one or

more specific quantized levels is necessary, occurrence of each of said one or more

specific quantized levels being repressed in a specific level region of the input image

data relating to said each of said one or more specific quantized levels through the re-

quantization by said third part (column 8, lines 44-56). Said third part determines that

re-quantization is not necessary when the level of the input image data is out of said

specific level region relating to each of said one or more specific quantized levels

(column 8, lines 57-58).

Regarding claim 58, Marcu discloses an image processing apparatus,

comprising: a first part adding an error to input image data (column 8, lines 30-32); a

second part multi-level quantizing the image data to which the error is already added by

said first part, using a plurality of quantization thresholds (column 8, lines 36-42; column

2, line 66-column 3, line 8; column 9, lines 59-67); a third part re-quantizing the

quantized data provided by said second part, to another quantized level, for one or

more specific quantized levels other than the highest quantized level and quantized

level 0, as the need arises, and outputting the thus-obtained data as an output image

data (column 8, lines 42-56; column 9, lines 4-35); a fourth part obtaining the error to be

added to the input image data, from the output image data and image data to which the error is already added by said first part, and providing the thus-obtained error to said first part (column 8, lines 57-61); and a fifth part detecting, from the output image data, the number of pixels quantized to be higher than the quantized level 0 in a specific region in the periphery of a target pixel, and providing the thus-obtained number to said third part (column 9, lines 14-32), wherein said third part comprises a threshold, relating to each of said one or more specific quantized levels, determined based on the number provided by said fifth part and the level of the input image data, with the level of the image data to which the error is already added, and, thereby, determines whether re-quantization for said each of said one or more specific quantized levels is necessary, occurrence of each of said one or more specific quantized levels being repressed in a specific level region of the input image data relating to said each of said one or more specific quantized levels through the re-quantization by said third part (column 8, lines 44-56).

Regarding claim 59, Marcu discloses an image processing apparatus, comprising: a first part adding an error to input image data (column 8, lines 30-32); a second part multi-level quantizing the image data to which the error is already added by said first part, using a plurality of quantization thresholds (column 8, lines 36-42; column 2, line 66-column 3, line 8; column 9, lines 59-67); a third part re-quantizing the quantized data provided by said second part, to another quantized level, for one or more specific quantized levels other than the highest quantized level and quantized level 0, as the need arises, and outputting the thus-obtained data as an output image

data (column 8, lines 42-56; column 9, lines 4-35); a fourth part obtaining the error to be added to the input image data, from the output image data and image data to which the error is already added by said first part, and providing the thus-obtained error to said first part (column 8, lines 57-61); and a fifth part detecting, from the output image data, the number of pixels for each quantized level in a specific region in the periphery of a target pixel, and providing the thus-obtained number to said third part (column 9, lines 14-32), wherein said third part comprises a threshold, relating to each of said one or more specific quantized levels, determined based on the total number of pixels of each of said one or more specific quantized levels and one or more other quantized levels near to said each of the one or more specific quantized levels and the level of the input image data, with the level of the image data to which the error is already added, and, thereby, determines whether re-quantization for said each of said one or more specific quantized levels is necessary, occurrence of each of said one or more specific quantized levels being repressed in a specific level region of the input image data relating to said each of said one or more specific quantized levels through the re-quantization by said third part (column 8, lines 44-56).

Regarding claim 60, Marcu discloses an image processing apparatus, comprising: a first part adding an error to input image data (column 8, lines 30-32); a second part multi-level quantizing the image data to which the error is already added by said first part, using a plurality of quantization thresholds (column 8, lines 36-42; column 2, line 66-column 3, line 8; column 9, lines 59-67); a third part re-quantizing the quantized data provided by said second part, into another quantized level, for one or

more specific quantized levels, as the need arises, and outputting the thus-obtained data as an output image data (column 8, lines 42-56; column 9, lines 4-35); a fourth part obtaining the error to be added to the input image data, from the output image data and image data to which the error is already added by said first part, and providing the thus-obtained error to said first part (column 8, lines 57-61); and a fifth part detecting, from the output image data, the number of pixels quantized to be higher than the quantized level 0 in a specific region in the periphery of a target pixel, and providing the thus-obtained number to said third part (column 9, lines 14-32), wherein said third part has a signal indicating a feature of an image region to which the target pixel belongs input thereto from the outside, and comprises a threshold, relating to each of said one or more specific quantized levels, determined based on the total number of pixels of each of said one or more specific quantized levels, determined based on a parameter relating to said each of said one or more specific quantized levels determined according to the feature indicated by said signal, the number provided by said fifth part and the level of the input image data, with the level of the image data to which the error is already added, and, thereby, determines whether re-quantization for said each of said one or more specific quantized levels is necessary, occurrence of each of said one or more specific quantized levels being repressed in a degree according to said feature in a specific level region of the input image data relating to said each of said one or more specific quantized levels through the re-quantization by said third part (column 8, lines 44-56).

Regarding claim 75, a sixth part generating said signal input to said third part is inherent in Marcu, for re-quantization in Marcu inherently requires at least an input of the quantized image data, image data of peripheral pixels, and threshold data for determining whether the quantized data needs to be re-quantized based on the quantization levels of the peripheral pixels.

Regarding claims 91-94, Marcu discloses a computer-readable recording medium storing therein a program for causing a computer to carry out the function of each part of the image processing apparatus as claimed in claims 56 and 58-60, respectively (as recited in Marcu's claims 19-26, a computer-readable recording medium is provided for causing a computer to execute the above steps).

Claim Rejections - 35 USC § 103

7.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8.   This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 1-8, 12-14, 31, 32, 76-79, 81-84 and 86-89 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marcu.

Regarding claim 1, Marcu discloses an image forming method, comprising the steps of multi-level quantizing a multi-tone image by an error diffusion method (image data values can be quantized to multiple levels, by error diffusion (column 2, line 66-column 3, line 8; column 9, lines 59-67)); and representing each pixel of the thus-quantized image having a quantized level higher than 0 using a dot (read Abstract), wherein occurrence of dots is repressed in a specific shade region relating to the dots (in highlight (range 230-255) and shadow (range 25-40) regions, isolated dots may be removed (column 4, lines 46-56)).

In Marcu, the dots are not disclosed as becoming larger as the quantized level thereof is higher, or repression of dots having a specific size. However, it is well known in the art of printing that multi-level image data can be formed on a page in a number of ways, including varying the size of printed dots according to the quantization level of the image data, so that darker quantization levels are printed using larger-sized dots. Marcu has indicated that the image data output using the error diffusion method disclosed in the reference may be multi-level, and since printing variable-sized dots in order to represent varying quantization levels is generally known, it would have been obvious for one of ordinary skill in the art to modify the teaching of Marcu by providing a

printer that prints dots of different sizes, so as to enhance the tonal resolution of the output image.

Regarding claims 2-7, repression of the occurrence of the smallest dots, or dots other than the largest dots, and basing control of an occurrence rate of the dots having the specific size on the number of dots having the specific size in a specific region in the periphery of a target pixel and a shade level of the target pixel, would have been obvious in view of Marcu, where in highlight and shade regions, the appearance of a dot at a target pixel location is repressed if one or more dots appear along a road map in the vicinity of the target pixel location (column 9, lines 4-27).

Regarding claim 8, changing the degree of repressing occurrence of the dots having the specific size according to a feature of the image would have been obvious in view of Marcu (repression confined to shadow and highlight regions (column 8, lines 42-58)).

Regarding claims 12-14, performing repression of occurrence of the dots having the specific size for medium and dark shade regions of the image would have been obvious in view of Marcu (shade region defined in the range of 25-40 (column 4, lines 35-38; column 8, lines 47-49), repression performed in shade region (column 4, lines 46-56), which inherently includes medium and dark shade regions).

Regarding claims 31 and 32, Marcu discloses an image forming method comprising the steps of multi-level quantizing multi-tone image data by the image processing methods as claimed in claims 15 and 16 (note rejection of claims 15 and 16 above); and forming an image from the thus-multi-level-quantized image data using dots

for pixels (read Abstract). As mentioned above regarding claim 1, while not disclosed in Marcu, it is well known in the art of printing that multi-level image data can be formed on a page in a number of ways, including varying the size of printed dots according to the quantization level of the image data, so that darker quantization levels are printed using larger-sized dots. Marcu has indicated that the image data output using the error diffusion method disclosed in the reference may be multi-level, and since printing variable-sized dots in order to represent varying quantization levels is generally known, it would have been obvious for one of ordinary skill in the art to modify the teaching of Marcu by providing a printer that prints dots of different sizes, so as to enhance the tonal resolution of the output image.

Regarding claims 76-79, the apparatus of Marcu further comprises a sixth part which forms an image from the image output data (column 3, lines 6-9). Marcu does not use dots for pixels which dots are larger as the pixels have higher quantized levels. However, as mentioned above with respect to claim 1, it is well known in the art of printing that multi-level image data can be formed on a page in a number of ways, including varying the size of printed dots according to the quantization level of the image data, so that darker quantization levels are printed using larger-sized dots. Marcu has indicated that the image data output using the error diffusion method disclosed in the reference may be multi-level, and since printing variable-sized dots in order to represent varying quantization levels is generally known, it would have been obvious for one of ordinary skill in the art to modify the teaching of Marcu by providing a printer that prints dots of different sizes, so as to enhance the tonal resolution of the output image.

Regarding claims 81-84, Marcu does not disclose a sixth part generating the input image by optically scanning an original, as Marcu is mainly concerned with the processing of image data already obtained. However, the use of an optical scanner for scanning image data to be processed is well known in the art and commonly used for capturing image data from a document. It would have been obvious for one of ordinary skill in the art to provide an optical scanner for scanning documents to be processed in the teaching of Marcu, because of the widespread use of such a device.

Regarding claims 86-89, these claims recite the optical scanning and forming of an image as recited in above-rejected claims 76-79 and 81-84, and are thus rejected for the reasons set forth above.

Allowable Subject Matter

10. Claims 64, 80, 85, 90 and 95 are allowed.

11. Claims 9-11, 25-27, 43-46, 55 and 61-63 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. The following is a statement of reasons for the indication of allowable subject matter: No prior art has been found to disclose or suggest repression of occurrence of dots of a specific size with respect to picture or non-edge regions, as recited in claims 9-11, 25-27, 43-45 and 61-63; or changing degrees of repression according to a specific output mode, as recited in claims 46 and 64. Claim 55 depends from claim 46; and claims 80, 85, 90 and 95 depend from claim 64.

13.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure.

     U.S. Patent 5,748,336 (Kakutani).

     U.S. Patent 5,917,614 (Levien)

     U.S. Patent 6,169,608 (Yoshida)

     Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Thomas D. Lee whose telephone number is (703) 305-

4870. The examiner can normally be reached on Monday-Friday (7:30-5:00), alternate

Fridays off.

     If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, David K. Moore can be reached on (703) 308-7452. The fax phone number

for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thomas D. Lee
Primary Examiner
Art Unit 2624

tdl
August 5, 2004